Navy Case 84,613 Inventors: Walton et al.

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CLAIMS

- 1. A large area plasma deposition system, comprising:
- A. an electron beam source having a width much larger in dimension than its thickness;
 - B. a plasma sheet produced by said electron beam passing through a gas; said plasma being a low electron temperature plasma sheet of pre-determined width, length, thickness, and location relative to a surface;
- 10 C. magnetic means for confining said beam so as to produce a geometrically well defined, spatially uniform plasma sheet;
 - D. a target comprising a material source for thin films or coatings;
 - E. a substrate upon which material sputtered from said target by said plasma is deposited as a thin film or coating.
- 2. The system according to claim 1, wherein said target is electrically biased above a sputtering threshold for said material source.
 - 3. The system according to claim 2, wherein said electrical bias is selected from DC or RF sources.
 - 4. The system according to claim 1, wherein said substrate is electrically biased.
- 5. The system according to claim 4, wherein said electrical bias is selected from DC or RF sources.
 - 6. The system according to claim 1, wherein the relative position of said beam, plasma, target and substrate is adjustable.
- 7. The system according to claim 1, wherein said film or coating material source is selected from the group consisting of metals, alloys, semiconductors or non-conducting materials.
 - 8. The system according to claim 1, wherein said electron beam source is selected from the group of sources consisting of a linear hollow cathode beam source, hot filament or field emitting electron source.
- 9. The system according to claim 1, wherein said gas is selected from the group consisting of atomic or molecular gases or mixtures thereof.

- 10. The system according to claim 1, wherein both target and substrate are electrically biased.
- 11. A hybrid large area plasma deposition system, comprising:
 - A. the electron beam plasma system defined in steps A. through C. of claim 1;
- B. in conjunction with said plasma system, a conventional physical vapor deposition (PVD) system for generating material for coating or deposition on a substrate, said materials being generated from a film material source by sputtering means or vaporization means.
- 12. The hybrid system of claim 13, wherein said sputtering means is selected from the group consisting of magnetrons or ion beams.
- 13. The hybrid system of claim 14, wherein said vaporization means is selected from the group consisting of electron beams, lasers or thermal sources.
- 14. The hybrid system according to claim 13, wherein said electron beam produced plasma is located between said source material and said substrate

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